

Name: _____

at1121exam_practice: Radicals and Squares (v2)

Question 1

Simplify the radical expressions.

$$\sqrt{12}$$

$$\sqrt{50}$$

$$\sqrt{75}$$

$$\frac{\sqrt{2 \cdot 2 \cdot 3}}{2\sqrt{3}}$$

$$\frac{\sqrt{5 \cdot 5 \cdot 2}}{5\sqrt{2}}$$

$$\frac{\sqrt{5 \cdot 5 \cdot 3}}{5\sqrt{3}}$$

Question 2

Find all solutions to the equation below:

$$10((x+8)^2 - 7) = 90$$

First, divide both sides by 10.

$$(x+8)^2 - 7 = 9$$

Then, add 7 to both sides.

$$(x+8)^2 = 16$$

Undo the squaring. Remember the plus-minus symbol.

$$x+8 = \pm 4$$

Subtract 8 from both sides.

$$x = -8 \pm 4$$

So the two solutions are $x = -4$ and $x = -12$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 + 18x = -56$$

$$x^2 + 18x + 81 = -56 + 81$$

$$x^2 + 18x + 81 = 25$$

$$(x + 9)^2 = 25$$

$$x + 9 = \pm 5$$

$$x = -9 \pm 5$$

$$x = -4 \quad \text{or} \quad x = -14$$

Question 4

A quadratic polynomial function is shown below in standard form.

$$y = 4x^2 + 24x + 27$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 4 .

$$y = 4(x^2 + 6x) + 27$$

We want a perfect square. Halve 6 and square the result to get 9 . Add and subtract that value inside the parentheses.

$$y = 4(x^2 + 6x + 9 - 9) + 27$$

Factor the perfect-square trinomial.

$$y = 4((x + 3)^2 - 9) + 27$$

Distribute the 4.

$$y = 4(x + 3)^2 - 36 + 27$$

Combine the constants to get **vertex form**:

$$y = 4(x + 3)^2 - 9$$

The vertex is at point $(-3, -9)$.